

NOTES ON THE WATER SNAKE *NATRIX COMPRESSICAUDA*.

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*Natrix compressicauda*¹ and its four hitherto described subspecies are confined wholly to Florida, where they inhabit the brackish lagoons and estuaries of the sea. Since specimens of this water snake are rare in collections, the systematic relationships of the several forms have not been thoroughly determined and any data on this subject should be of interest. Having examined some fifteen adults and a brood of fifteen young from the collection of the Museum of Comparative Zoology, we have found a remarkable variability in individuals from the same locality, while those from different localities have not shown any peculiar characters correlated with their distribution. The young from one brood are dichromatic and show many of the same variations as the adults, and seem to make it certain that there is but a single variable form to be recognized.

Mr. A. G. Reynolds, of Gulfport, Fla., who has collected a large proportion of the known specimens of *Natrix compressicauda*, is familiar with this variability of color in fresh specimens. In a letter of September 23, 1914, he writes:

"I have never found it anywhere except in brackish or salt water. Its local name is the 'salt-water moccasin.' The fishermen occasionally find it plentiful among the keys, but they never get me any specimens, although I offer a good price for them. It seems to be more or less plentiful at Key West. Here we get a straw-colored variety, also a variety with one row of spots beneath, and a variety with three rows of spots beneath."

With the exception of one specimen, the entire series in our collection was taken by Mr. A. G. Reynolds. All but one of these have been taken within the last few years and come from different parts of the region of Tampa Bay and Key West. One of the Tampa Bay specimens, kindly loaned for examination by the Academy of Natural Sciences of Philadelphia, comes from Tarpon Springs and was collected by S. N. Rhodes, in 1896. The others from this region were taken at St. Petersburg by Mr. Reynolds.

¹ Kennicott, *Proc. Acad. Nat. Sci. Phila.*, 1860, p. 335.

Of the Key West specimens there is one (M. C. Z. 2,444) worthy of special note. Cope² says in speaking of *N. c. compsolaema*:

“The only known specimen of this subspecies was found at Key West, Florida, and is preserved in the Museum of Comparative Zoology, Cambridge, Mass.”

The specimen to which Cope refers cannot now be found in the museum. The only example which might be mistaken for it is No. 2,444. But this specimen came with another (M. C. Z. 2,446) of the same species, which also seems to have disappeared. Both were said to have been collected in the Florida Keys and probably at Key West by L. F. de Pourtales. They were given by him to the museum and were entered in the register by S. Garman in 1874.

That No. 2,444 cannot possibly have served Cope as the type of his *N. c. compsolaema* is shown by several noteworthy discrepancies. The tail and body lengths of the specimen (No. 2,444) are each some hundred millimeters longer than was Cope's type, and the dorsal rows are 21 as against the 19 given by Cope. Furthermore, the head shield characters of the two specimens are not the same.

Cope's type was probably not returned by him to the museum, and wide inquiry elsewhere has failed to locate it. Unfortunately, this is not the only specimen which suffered this fate.

THE DESCRIBED FORMS.

Cope³ sums up the characters of the several races in respect to color as follows:

“*N. c. compressicauda* (Kennicott): numerous dark cross bands, which are resolved into three rows of spots just anterior to the tail, and four longitudinal stripes on the neck.

“*N. c. taniata* Cope:⁴ four series of longitudinal spots above, those of the median pair forming two longitudinal stripes on the greater part of the length; the laterals forming stripes on the neck only.

“*N. c. walkeri* (Yarrow):⁵ yellowish with narrow brown bands, no postocular band.

“*N. c. obscura* Lonnberg:⁶ sooty above with transverse bands anteriorly.

“*N. c. compsolaema* (Cope):⁷ above blackish brown with numerous closely placed cross bands.”

² *Annual Report of U. S. National Museum*, 1898 (1902), p. 984.

³ *The Annual Report of U. S. National Museum*, 1899 (1902), p. 979.

⁴ *Amer. Natl.*, 1895, p. 676.

⁵ *Proc. U. S. Nat. Mus.*, 6, 1883, p. 154.

⁶ *Proc. U. S. Nat. Mus.*, 17, 1894, p. 330.

⁷ *Proc. Acad. Nat. Sci. Phila.*, 1860, p. 368.

The body scale counts as given by Cope are:

<i>N. c. compressicauda</i>	21	$\frac{131}{93}$
<i>N. c. tenuata</i>	21	$\frac{131}{82}$
<i>N. c. walkeri</i>	23	$\frac{137}{(?)}$
<i>N. c. obscura</i>	21	(?)
<i>N. c. compsolaema</i>	19	$\frac{126}{67}$

The head shield characters of *N. c. tenuata* and *N. c. walkeri* are not treated very fully by Cope or Yarrow, while for *N. c. obscura* no scutation is given at all. Because the data given by Cope are incomplete, only the following can be expressed:

	Labials.	Pre- and postoculars.	Temporals.
<i>N. c. compressicauda</i>	8+10	1+3	1+3
<i>N. c. tenuata</i>	8+10	1+3	1+3
<i>N. c. walkeri</i>	8+10	1+3	1+3
<i>N. c. obscura</i>		Not given.	
<i>N. c. compsolaema</i>	8+9	1+3	?

Again, the length of the tail in percentage to total length taken from Cope would be:

<i>N. c. compressicauda</i>	28.8%
<i>N. c. tenuata</i>	25.9%
<i>N. c. walkeri</i>	?
<i>N. c. obscura</i>	?
<i>N. c. compsolaema</i>	21.5%

Lastly, a glance shows that the type locality of these "races" are all in the same faunal area. Two of the races came originally from Tampa Bay and two from Key West, while the remaining one was from the opposite side of Florida, taken at Volusia.

THE ADULT SPECIMENS.

Trying to classify the fifteen adults under the five described races, we find that none conform in every detail to any one race, but that each one presents some of the characters from more than one "sub-species." Eight of these adults are from Tampa Bay, the other seven from Key West.

The coloration of the adults shows a gradual change dorsally from the dark brown to the light straw-colored phases and from the wide

to the narrow-banded conditions; ventrally from the two-lined form to one with a single row of spots anteriorly. The longitudinal stripes on the neck and the oblique body stripes typical of *N. c. compressicauda* are well defined on two specimens before us from St. Petersburg. There is another specimen from the same region which approaches *N. c. walkeri* in characteristic ground tone and markings, but the dorsal surface is darker and there is a vestige of the neck stripes found in *N. c. compressicauda* and *N. c. taeniata*. One Key West specimen follows the description of *N. c. compsolæma* almost exactly, while four others from Key West form distinct steps toward the typical *walkeri* pattern and coloration. Eliminating the three specimens from St. Petersburg, Tampa Bay, and the one from Key West which have a uniform straw-color and leaving out the one specimen from Key West that approaches *N. c. obscura* and which may be considered as melanistic, we have ten specimens remaining which seem to show a gradual change in pattern and color from *N. c. compressicauda*, through *N. c. taeniata*, *N. c. compsolæma*, to *N. c. walkeri*. Throughout this series no one character is distinctive enough to separate a race, although the Key West specimens all show a darker ventral surface. The straw-colored form is uniform and therefore has no distinguishing color characters, but the sooty variety approaching *N. c. obscura* seems to be a melanistic form of *N. c. compsolæma*, since its spots and faint bars have that arrangement.

The scale rows of the adult specimens present as pronounced a variation: there is no correlation between the color patterns and the number of scales and the counts given by Cope cannot be taken as differential characters of separate races. Two of the specimens before us have twenty-three dorsal rows, yet one has a color pattern typical of *N. c. compressicauda* while the other approaches *N. c. walkeri*. The range of the scale counts of the Tampa Bay specimens is expressed by the formula:

$$21-23 \frac{126-135}{68-83},$$

and the average is:

$$21.3 \frac{129.8}{73.1}$$

The Key West specimens, on the other hand, have the range of

$$21 \frac{128-134}{72-82}$$

and the average of

$$21 \frac{131.2}{77.7}$$

It is noteworthy that the sooty specimen like *N. c. obscura* in color has a very high scale count, it being $21\frac{134}{81}$, but since several other counts are nearly as large no significance can be placed on this. As only two of the fifteen specimens are females, and since these have average body scale counts, no sex differentiation is shown.

In the relative length of the body and tail the adult specimens vary greatly from the described forms. For example, the one specimen which follows so closely the description of the color of *N. c. compsolæma*, and which also came from Key West, has for its body-tail proportions 27.1%; Cope, on the other hand, gives measurements of 21.5%. The Tampa Bay specimens check up lower in average than the Key West ones. The range for the former being 22.6%–25.4%, average 24.1%, while the latter is 24.8–28.2%, average 26.1%. Since there is an overlapping of the high numbers of the former and the low ones of the latter and since the range of the whole series is not very great, races cannot be separated.

In the same way, the head scutation of the adults show great variation. For example, two of the male specimens from Key West (*A* and *B*) have a color pattern very similar to *N. c. walkeri*, their dorsal rows are both twenty-one, yet they differ considerably as shown below. Another specimen (*C*) from St. Petersburg is very similar to *N. c. compressicauda* in color pattern, it has twenty-three dorsal rows, yet its head characters are like those of (*B*).

	Key West.		St. Petersburg.
	<i>A</i>	<i>B</i>	<i>C</i>
Labials.....	$\frac{9+10}{10+10}$	$\frac{8+8}{9+10}$	$\frac{8+8}{10+10}$
Oculars.....	$\frac{2+2}{1+1}$	$\frac{2+2}{1+2}$	$\frac{2+2}{1+1}$
Temporals.....	$\frac{1+4}{1+3}$	$\frac{1+3}{1+3}$	$\frac{1+3}{1+3}$

Moreover, as a whole this variability is very great, the ranges for individuals of the respective localities being:

	Tampa Bay.		Key West.	
Labials.....	$\frac{8+8}{10+10}$	$\frac{9+9}{11+11}$	$\frac{8+8}{10+10}$	$\frac{9+9}{11+11}$
Oculars.....	$\frac{2+2}{1+1}$	$\frac{3+3}{2+1}$	$\frac{1+2}{1+1}$	$\frac{3+2}{3+3}$
Temporals.....	$\frac{1+3}{1+3}$	$\frac{2+3}{2+3}$	$\frac{1+2}{1+2}$	$\frac{1+4}{1+3}$

In regard to the geographical distribution of these "forms," we have already spoken of their limited range. Although the museum has a series from Tampa Bay and Key West, no toptype of *N. c. taniata* is at hand. Nevertheless, some of the specimens before us from Tampa Bay and Key West show most of the characters of this supposed race.

THE BROOD OF YOUNG.

The variability in color characters of the adults finds correlation in a brood of fifteen young born from a specimen similar to the typical *N. c. compressicauda*. The mother was taken alive by Mr. A. G. Reynolds and the young were born in captivity. They are distinctly dichromatic; one group, ten in number, being like the adult but with generally lighter ground color—in other words, approaching *N. c. walkeri*—while the others, five in number, are uniformly straw-color, as seen in some of the other adults. The oblique dorsal bands of the young vary somewhat in width, but there is not as much variation as we see in the adults. In fact, the young of this brood present in color only two or possibly three of the phases which are seen in the older individuals.

In comparing the scutation of the young water snakes, on the other hand, we find a great variability of the head shields and the body scale counts. The dorsal rows have a constant number, twenty-one, the same as the mother. The range of the ventral-subcaudal scale count is:

$$\frac{126}{68} - \frac{132}{82}, \text{ average } \frac{129.06}{74.2}$$

Since six of this brood are females and four of these six have low counts while two have high ones, no general statement can be made on sex differentiation. Turning to the head shields, we find almost as much variation as in the adults. The range of these characters in the brood is:

Labials.....	$\frac{8+8}{10+10}$	-	$\frac{9+9}{10-11}$
	$\frac{2+2}{1+1}$	-	$\frac{3+3}{1+1}$
Oculars.....			
	$\frac{1+2}{1+2}$	-	$\frac{2+3}{2+3}$
Temporals.....			

The average count would be:

Labials $\frac{8+8}{10+10}$; Oculars $\frac{3+2}{1+1}$ or $\frac{3+3}{1+1}$; Temporals $\frac{1+3}{1+3}$

Regarding the relative length of body and tail, we would expect the proportion to run rather low since the brood comes from Tampa Bay. But this is not the case. The range is 25.5%-27.8%, average 27.1%.

From this it may be seen that but one race of *Natrix compressicauda* can be recognized.